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1978

GROUND WATER SURVEY

TOWNSHIP OF TAY
(WAUBAUSHENE)

1978

Ontario
Ministry of the Environment

The Honourable
Harry C. Parrott, D.D.S.,
Minister

K.H. Sharpe,
Deputy Minister

MINISTRY OF THE ENVIRONMENT

GROUND WATER SURVEY

TOWNSHIP OF TAY
(WAUBAUSHENE)

I.R. PAWLOWSKI
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TOWNSHIP OF TAY - WAUBAUSHENE
GROUND WATER SURVEY

Introduction

In conjunction with the proposed upgrading of the Waubaushene water supply system, the Ground Water Development Section was requested to complete a ground water survey outlining the feasibility of locating sufficient ground water resources for municipal use.

The survey was carried out during August and November 1977 and was confined to an area within a 6 km (4 miles) radius from the centre of town. Field work included examination of geologic and topographic features. Water samples were taken from selected well sites and tested for both chemical and bacteriological quality. The analyses are presented in Table 2 of the Appendix.

A review of the available water well data and ground water surveys (Elmvale and Midland) provided an insight into to probable well yields and size of the most productive aquifers in the Waubaushene area. Selected well record data used in the hydrogeologic compilation are included in Table 2. The well record locations are plotted on Drawing No. 1.

Existing Water Supply & Requirements

The existing water supply system in Waubaushene consists of a surface water intake into Georgian Bay, an elevated storage tank with a capacity of 212,000 Litres (47,000 igal.) and a small diameter distribution line. The system now supplies water to a population of about 500 persons at a capacity of about 16 L/s (208 igpm).

The communal system was built in 1940 and has since become inadequate to serve the community effectively. A programme has been initiated to upgrade these existing facilities. Future demand requirements have not been established at this time. Although for present population and demand requirements the water supply should be capable of producing at least 6 L/s (80 igpm) on a continuous basis. Fire flow requirements are not provided for in the above estimate.

Bedrock Characteristics

The study area is situated at the edge of the Paleozoic sedimentary basin where considerable erosion has removed much of the existing sequence leaving only the lower-most limestone formation. At Hog, Sturgeon and Matchedash Bay the limestone has been completely eroded away and the Precambrian granites are exposed.

Dr. B. A. Liberty (1969, G.S.C. Memoir 355) has mapped the Middle Ordovician sediments and has identified the Bobcaygeon and the Gull River limestones and also the underlying Shadow Lake red shale and sandstone. The Precambrian Shield granites underly the sedimentary sequence and outcrop east and south of Matchedash Bay.

In the down hole drilling records a distinction between the Bobcaygeon and Gull River Formation was not made. The two lithologies are distinguishable as the Bobcaygeon is a buff medium grained limestone whereas the Gull River Formation is a brown sublithographic limestone in which the individual grains are barely visible.

The Bobcaygeon and the Gull River Formations combined, generally vary from place to place in thickness from 21 to 3 metres (70 to 10 feet), thinning towards the northeast. The irregular thickness occurs because of the erosional and undulating granite surface underlying the limestone sediments. Where the surface is more deeply incised, a thicker sequence of Paleozoic sediments has developed. Well drillers reported shales, belonging to the Shadow Lake Formation, only on the western shore of Sturgeon Bay.

The erosional limestone surface slopes towards Georgian Bay while the sedimentary beds dip southward. At the contact with the Precambrian Shield, the limestone was carved by both glacial and subsequent lake erosion into a notched shallow escarpment. The foot of the escarpment is now submerged and below the lake level of 177 metres (580 feet) below mean sea level.

Hog, Sturgeon and Matchedash Bay occur where erosional channels or notches have been cut into the escarpment face. The bedrock channels under Hog & Sturgeon Bay appear to continue further inland although are now buried. If the channels are infilled with any coarse overburden material it could point to the presence of an aquifer. The ground water potential of the buried bedrock channels is discussed later.

Ground Water in Bedrock

Ground water occurrences in the bedrock are associated with secondary rock structures such as joints, fractures, faults, where water can move easily. Water movement along bedding planes and through solution channels is most common in limestone areas.

The primary permeability of the massive limestones and granites in the Waubaushene area is very low and can be compared to that of clay. Therefore the extensiveness of open and well connected joints and factures receiving recharge will ultimately control the amount of ground water available for development at any particular site.

Twenty-six bedrock wells are selected and reviewed in this report. Nineteen of those wells encountered sufficient water for domestic use within the Precambrian granite, six within the Gull River limestone and one within the Shadow Lake sandstone.

The limestone formations in the study area are not as productive as the granite as only 27 percent of the bedrock wells found water in the limestone sufficient for domestic use. The low production generally indicates that the secondary rock fractures, and solution channels are not completely open and conducive to water movement through the limestone. Most wells penetrated through the Ordovician sediments and found water in the granites where fractures appear to be better developed. Because the ground water is associated with an irregular network of cracks and fissures the identification of specific aquifer horizons in bedrock is not reliable.

However, based on the well records, domestic wells encountered sufficient water at any depth of rock penetration. The chances of locating a reliable water supply of good quality water reduces severely beyond 30 metres (100 feet) of rock penetration.

The shallow rock aquifers, at Sturgeon Bay, because they occur below lake level, may be connected to the lake. The lake may provide a source of immediate recharge to these aquifers. The average adjusted theoretical yield of wells in this area is in the order of 4 L/s. (49 igpm). The water is high in total dissolved solids and sulphates. In terms of water yielding capabilities the shallow rock aquifers at Sturgeon Bay are the most productive yielding 4 L/s (49 igpm). With some treatment the water may be used for municipal water supply. In the remainder of the Waubaushene area and further inland, the adjusted theoretical yield is less than one L/s (12 igpm).

Overburden Characteristics

Waubaushene is located on a lacustrine sand plain. Occasional remnant beach and shoreline gravels occur at surface which mark the various stages of the ancient glacial Lake Algonquin. The topographic high within Waubaushene is mapped by Chapman and Putnam (1975, map 2228 ODMNA) as just such a remnant beach. Drill records indicate about 15 metres (50 feet) of unsaturated sand and gravel lying directly above the bedrock surface.

Further inland, and south of Victoria and Sturgeon Bays, drumlinized till plain deposits are identified. Thicknesses of up to 48 metres (150 feet) have been reported to consist mainly of clay with the occasional gravel horizons. Well record data shows that the "till" sequence extends right to the bedrock. Sandy saturated horizons are reported at various depths in the southern half of Conc. VII, of Tay Township. (Drawing No. 1.)

Glacial ice sheet advances and recessions and the rising and falling lake levels during the Pleistocene period have

resulted in erosion and deposition of a varying sequence of materials. The geological development of the resulting sediment sequence is difficult to interpret and lateral changes in coarseness and thickness are expected over short distances. Generally, the sand or gravel lenses in the "till" sequence are likely localized occurrences of small extent and may occur interbedded with clay. Few wells have penetrated to rock in the southwest portion of the study area, however sandy horizons could occur along the bedrock as infilling of the buried bedrock channels and could be extensive.

As discussed earlier, buried bedrock channels have been identified at Hog and Sturgeon Bay. The channel at Matchedash Bay is so shallow that parts have remained exposed. The channels at Hog and Sturgeon Bay are buried with more than 30 metres (100 feet) of Pleistocene and lake sediments. The possibility of encountering saturated granular material at the base of the sequence is good. Laterally the channels appear to continue south west and beyond the limits of the study area towards the Village of Elmvale.

Ground Water in the Overburden

Groundwater in the overburden is generally found in permeable material such as sand and gravel. The thickness and extent of the saturated sand and gravel deposits define the viability of an aquifer. Clay and "till" materials are not generally conducive to the flow of ground water and may be considered impermeable.

Twenty-six of the 52 well records reviewed reported domestic water supplies within sandy lenses in the dominantly clay sequence. The average adjusted theoretical yield of these wells is calculated to be 3 L/s (41 igpm).

The main overburden aquifer is located about 6 Km (4 miles) south west of Waubaushene and occurs at a depth between 30 and 46 metres (100 to 150 feet). The thickness of the sand and gravel horizon is likely less than 8 metres (25 feet)

and occurs interbedded with silts and clays. The lateral extent is estimated to be less than a mile. The adjusted theoretical yield is approximately 2 L/s (30 igpm). Poor water quality does not appear to be prevalent in the overburden aquifer zones, although elevated iron concentrations have been observed.

The two bedrock channels, described earlier, occur as inland extensions of Hog and Sturgeon Bay. Deep well data is sparse because water bearing horizons are normally encountered within 30 metres (100 feet) of ground surface.

Farther west at Elmvale, the erosional bedrock channel is infilled with a sequence of silty clay, with saturated sand and gravel horizons. Elmvale's present water supply of 27 L/s (350 igpm) is obtained from an overburden aquifer located between 168 metres (550 feet) and 152 meters (500 feet) elevation. The lower elevation matches the bottom elevation of the bedrock channel at Hog and Sturgeon Bay. The possibility that a lower overburden aquifer may be present at a similar elevation further east toward Hog and Sturgeon Bay appears good.

The ultimate yield of wells if completed in the lower aquifer would be dependent upon the thickness, lateral extent of the recharge to the saturated coarse material and also the well efficiency. Test drilling to confirm the location of the buried channel and the presence of the lower sand or gravel aquifer would be helpful in establishing the true groundwater potential and the groundwater quality in this area as indicated in Drawing No. 1.

Until the presence and yield of any lower aquifer material has been established, the most productive known overburden aquifer is located at a considerable distance south west of Waubaushene and is capable of about 2 L/s (30 igpm) while the water quality is generally suitable for municipal use elevated iron concentrations may be expected.

Water Quality

The purpose of obtaining water analyses for this survey is to determine the ground water quality within the various overburden and bedrock aquifers and to compare the ground water to the surface water which is presently supplied to the residents of Waubaushene.

Seventeen water samples were collected and analysed at the M.O.E. Laboratory. The samples were taken from: four overburden wells, six bedrock wells, two dug wells, one spring, two surface water sites and two from wells of unknown depth. The sites are identified in Drawing No. 1 and analyses are listed in Tables 2, 3 and 4 of the Appendix.

Both surface and ground water can be classified as hard, calcium carbonate dominant water. The surface water hardness ranges from 147 to 114 ppm $CaCO_3$; for overburden wells from 191 to 238 ppm $CaCO_3$; for bedrock, wells from 31 to 659 ppm $CaCO_3$.

In the Waubaushene area, the water quality from the bedrock wells shows variations with the lithology of the water bearing zone. Aquifers of granitic rocks usually produce waters that are soft and slightly alkaline, while limestone aquifers tend to produce hard and more neutral water.

The water quality of bedrock wells becomes increasingly unplatable with increased depth of the aquifer. High concentrations of chlorides and sulphates, exceeding Ministry Standards were observed in only two granite wells. Where chlorides were above 50 ppm, the total dissolved solids approached or exceeded the Ministry Standard of 500 ppm. This appeared in six of the samples collected, five of which are from bedrock wells. Iron concentrations exceeding the Standard of 0.3 ppm Fe were encountered in only four of the seventeen samples and are also mainly associated with the bedrock aquifers.

It appears that although the yield from the bedrock aquifers is higher than that generally produced from overburden aquifers the possibility of encountering water quality requiring some form of treatment is high.

The overburden aquifers generally produced water quality suitable for municipal use. The water is not too different from the water quality of the Georgian Bay water, already distributed to the Community.

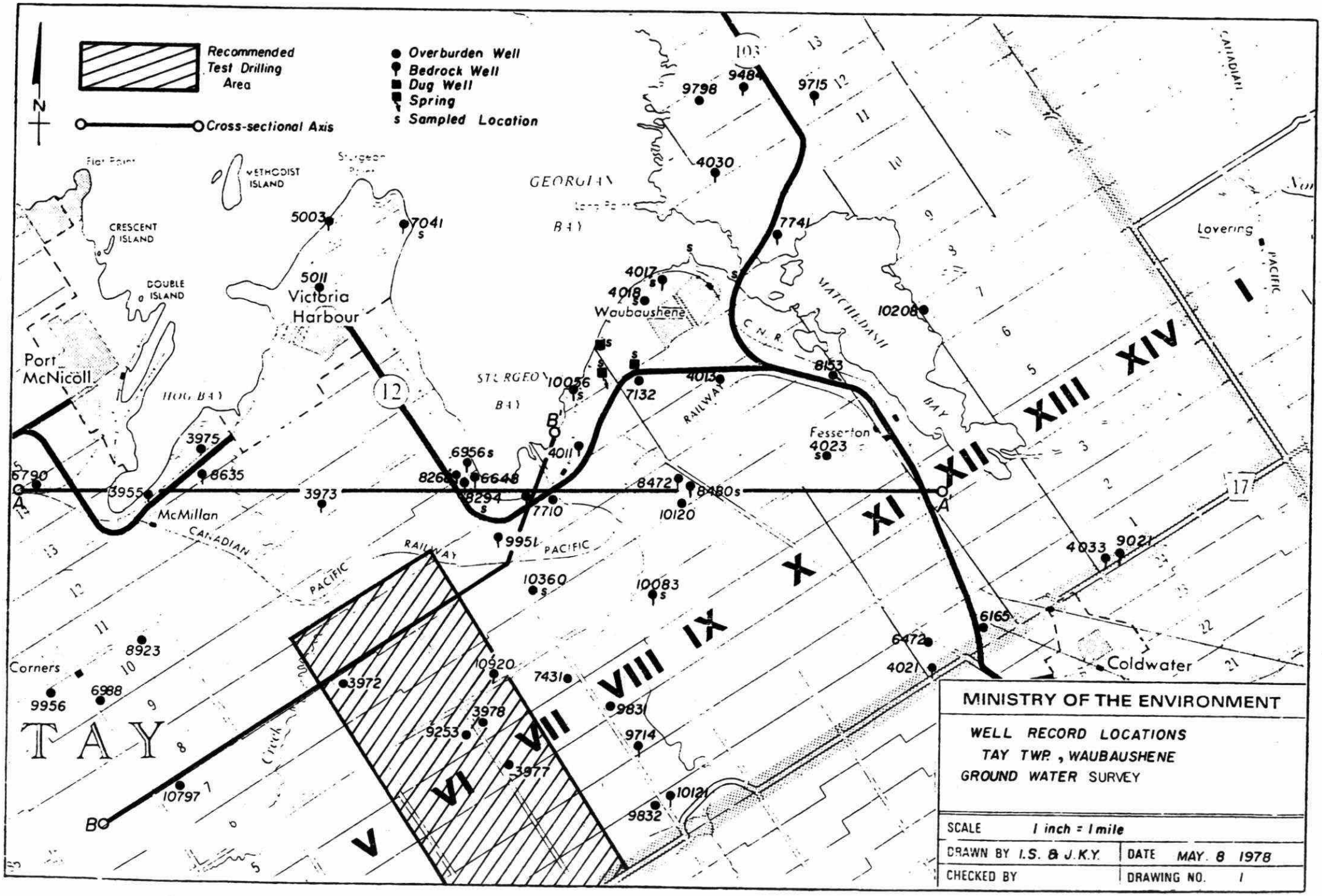
Conclusions

The feasibility of locating a ground water source with good quality water capable of producing at least 4 L/s (80 igpm) is limited.

The only area which is capable of producing the required yield is located about 5-6 Km (3 - 4 miles) from Town. An overburden aquifer is present at a depth of between 30-45 metres (100 and 150 feet). The presence of the buried bedrock channel described earlier which occurs in this area may indicate the possibility of finding another deeper overburden aquifer at the bedrock contact. Test drilling to determine the configuration of the buried channel and to confirm the perennial yield of aquifers encountered may be warranted in the area outlined on Drawing No. 1.

Recommendations

The groundwater conditions in the immediate vicinity of Waubaushene of 2 or 3 Km (1 - 2 mile) radius are unfavourable for the development of the desired 6 L/s (80 igpm). However test drilling of the area to the southwest of Waubaushene could be productive but should only be undertaken if the economics appear justifiable.


Recommended Test Drilling Area
Cross-sectional Axis
Overburden Well
Bedrock Well
Dug Well
Spring
s Sampled Location
N
GEORGIAN BAY
STURGEON BAY
METHODIST ISLAND
CRESCENT ISLAND
DOUBLE ISLAND
Victoria Harbour
Waubaushene
Port McNicoll
HOG BAY
McMillan
Fesserton
Lovering
Coldwater
Corners
TAY
CANADIAN PACIFIC RAILWAY
C.N.R.
WATCHEDASH BAY
12
A
A'
B
B'
I
II
III
IV
V
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VII
VIII
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X
XI
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9798
9484
9715
4030
7741
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7041
5011
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4018
10208
10056
7132
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8294
7710
8472
8480s
10120
9951
4023
4033
9021
10360
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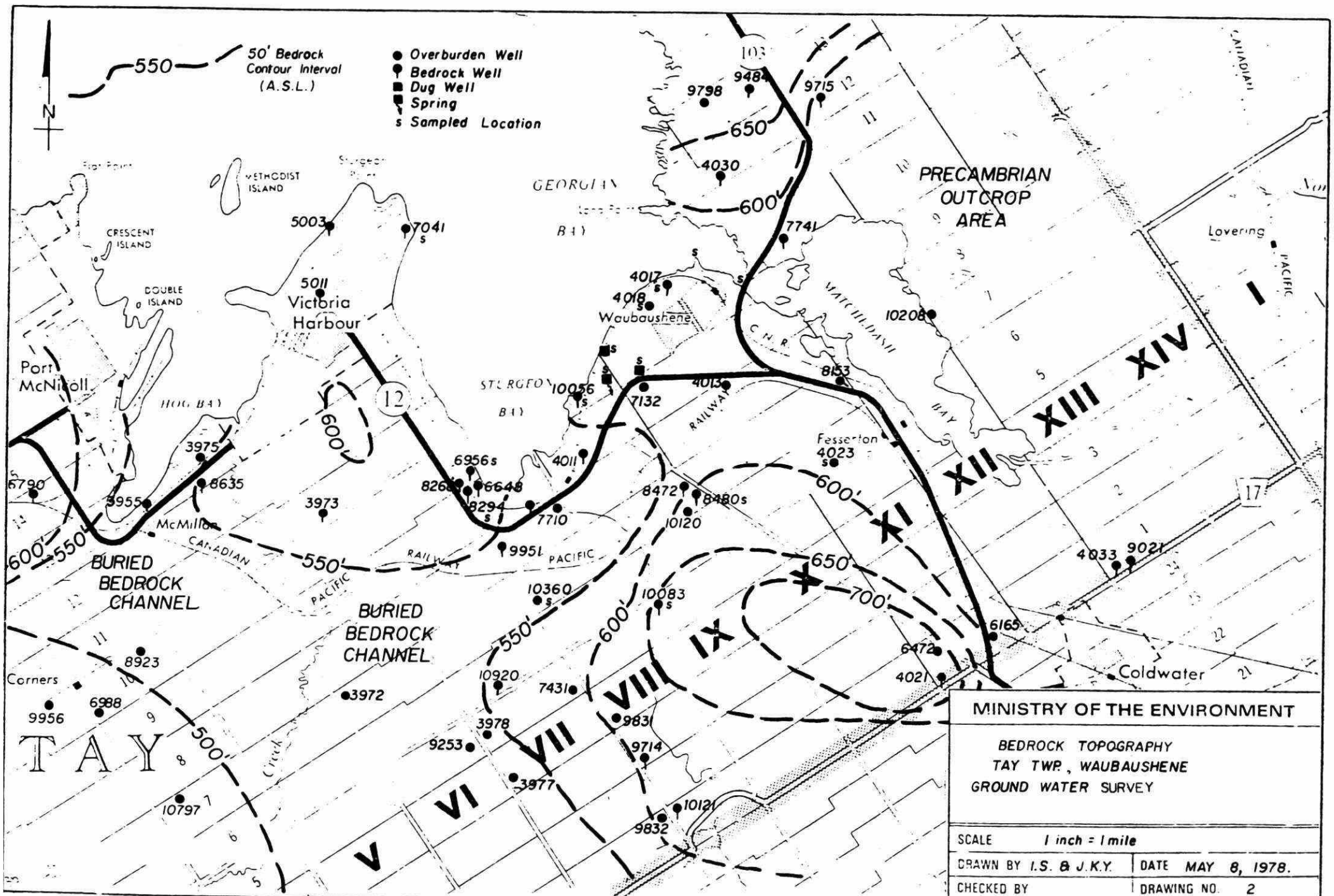
6165
6472
4021
8923
6988
9956
10920
3972
7431
3978
9253
9831
9714
3977
10797
10121
9832
MINISTRY OF THE ENVIRONMENT
WELL RECORD LOCATIONS
TAY TWP., WAUBAUSHENE
GROUND WATER SURVEY
SCALE 1 inch = 1 mile
DRAWN BY I.S. & J.K.Y.
DATE MAY. 8 1978
CHECKED BY
DRAWING NO. 1



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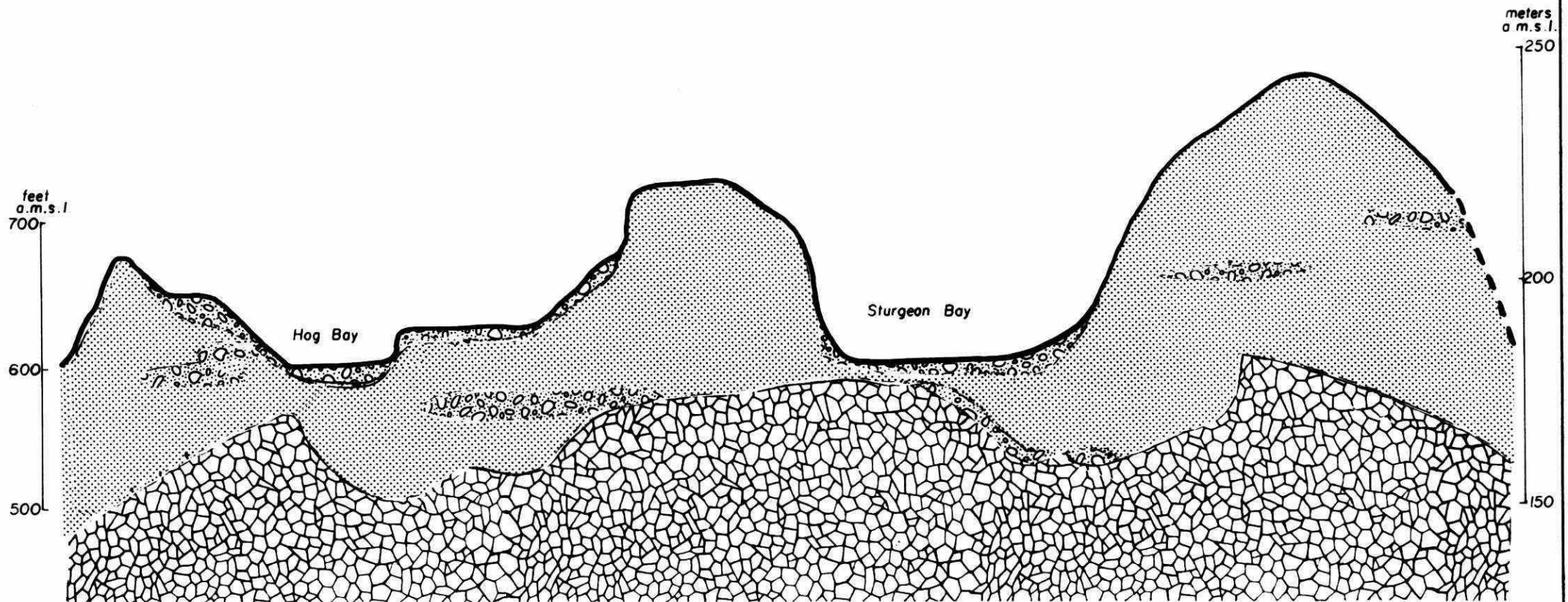
BEDROCK TOPOGRAPHY
TAY TWP., WAUBAUSHENE
GROUND WATER SURVEY

SCALE 1 inch = 1 mile	
DRAWN BY I.S. & J.K.Y.	DATE MAY 8, 1978.
CHECKED BY	DRAWING NO. 2



AQUIFERS (saturated sand and gravel materials)

TILL (clay, silt, with boulders and hardpan)

BEDROCK (Gull River Limestone and Granite)

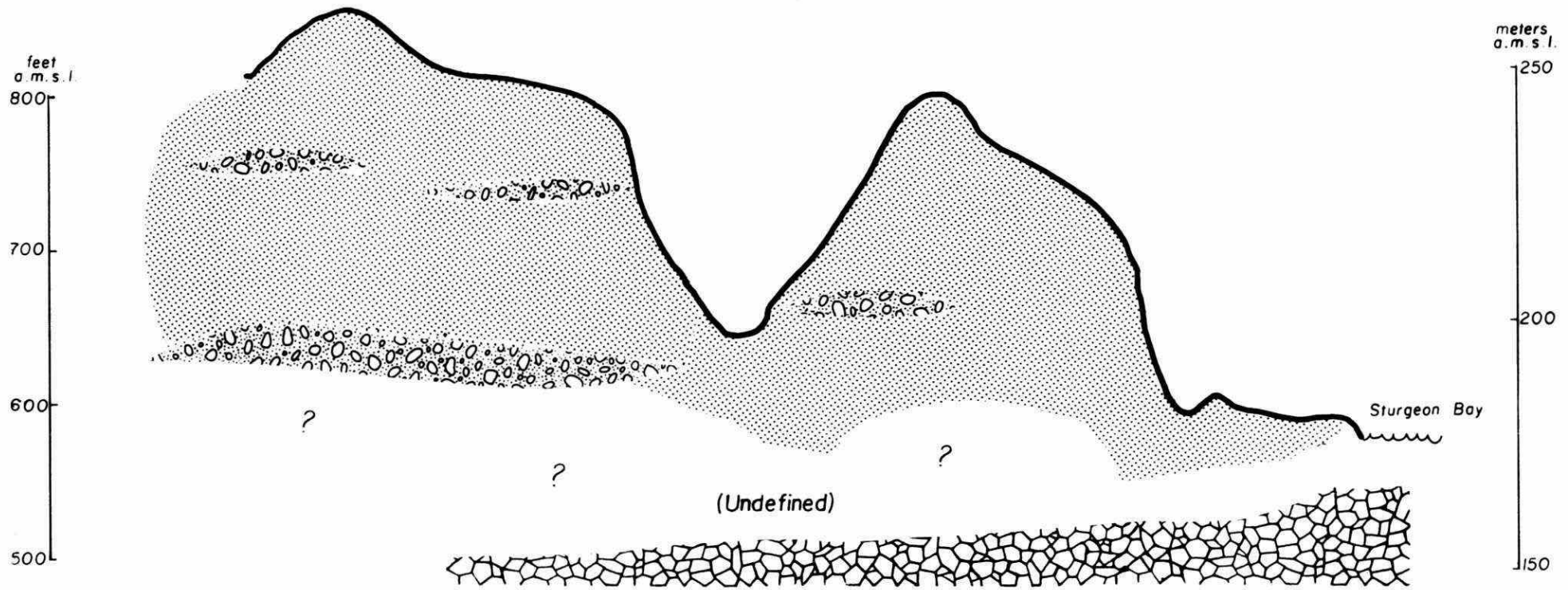
MINISTRY OF THE ENVIRONMENT

BURIED BEDROCK CHANNELS

E-W CROSS SECTION

SCALE HORIZONTAL 1:50,000 VERTICAL 1" = 100'	
DRAWN BY J.K.Y.	DATE MAY 1978
CHECKED BY	DRAWING NO. 3

TRANSLAR 250-9-75



AQUIFERS (saturated sand and gravel materials)

TILL (clay, silt, with boulders and hardpan)

BEDROCK (Gull River Limestone and Granite)

MINISTRY OF THE ENVIRONMENT

BURIED BEDROCK CHANNEL

LONGITUDINAL SECTION

SCALE	HORIZONTAL 1:50,000 VERTICAL 1" = 100'		
DRAWN BY	J.K.Y.	DATE	MAY 1978
CHECKED BY		DRAWING NO.	4

TRANSLAR 250-9-75

Ministry of the Environment
Ontario

Table / Summary of Water Well Records

Date AUG '77

Prepared by JKY

Well No	Location and Elevation	con	lot	Owner	Driller	year	Well Type	Well Diameter (inches)	Depth (feet)	Static Level (feet)	Pumping Test (gpm)	(hrs)	Pumping Level (feet)	Quality	Use	Remarks. Log etc
9253	WAUBAUSHENE 901'	6	4	IRISH, CLIFF	ANDERSON DRILLING	72	•	5	74	39	6	1	39	FR	D	0 CLAY SAND BOULDERS 11 CLAY SAND GRAVEL BOULDERS 49 SAND 72 *49
3972	VICTORIA HARBOUR 725'	6	7	MOUNT, A.	SNIDER	66	•	6½	50	1	40	2	11	FR.	FARM	0 STONEY CLAY 9 HARDPAN + BOULDERS 21 GRAVEL + SAND 50 *50
3973	VICTORIA HARBOUR 680'	6	12	SCOTT, L.	HEARY HAMMERS	66	•	5	99	26	4	7	95	FR	FARM	0 DUG WELL 25 CLAY, SAND, GRAVEL, BOULDERS 70 CLAY, SILT, SAND, GRAVEL 88 LIMESTONE 99 *95
8635	VICTORIA HARBOUR 600'	6	13	HUTCHINSON, L.	HAMMERS	71	•	6	195	28	2	2	160	FR	D	0 DUG WELL 30 * CLAY GRAVEL BOULDERS 81 REDGRANITE 113 BL. GRANITE 195
3975	VICTORIA HARBOUR 595'	6	13	CROWSTON, A.W.	HADCOWELL DIGGING	65	•	5½	66	30	1½	2	40	FR	D	0 SAND BOULDERS 11 *35,59 COURSE SAND 16 FINE GRAVEL, LARGE BOULDERS 35 FINE GRAVEL 59 HARD ROCK 66
7431	WAUBAUSHENE 830'	7	5	MARTIN, W H.	SNIDER	70	•	6	115	61	18	3	92	FR	D	0 SANDY LOAM 13 CLAY BOULDERS 26 CLAY + GRAVEL 62 CLAY + BOULDERS 90 CLAY + GRAVEL 99 FINE SAND 108 COURSE SAND 115 *110
3978	VICTORIA HARBOUR 890	7	4	ROMNEY, V.	HAMMERS	65	•	6	177	140	10	1½	160	FR	FARM	0 TOPSOIL ½ SAND 5 SANDY CLAY + BOULDERS 73 CLAY WITH GRAVEL 117 SANDY CLAY 137 COURSE SAND 152 CLAY 154 SAND + CLAY 175 SAND + GRAVEL 177 *
3977	VICTORIA HARBOUR 820'	7	3	DREW, J.E.	HAMMERS	67	•	6	192	140	5	4	189	FR.	D	0 TOPSOIL 2 SAND CLAY BOULDERS 76 CLAY + PEBBLES 96 SAND + GRAVEL 132 COURSE SAND 160 GRAVEL + SAND 166 SAND SOME CLAY 186 SAND 192 *189
9832	WAUBAUSHENE 800	7	1	WOODS, VV.	HURONIA WELL DRILLING	73	•	6	138	65	10	1	65	FR	D	0 LOAM BOULDERS 3 HARDPAN 19 CLAY + STONES 103 CLAY + SILT 131 FINE SAND 133 COURSE SAND 138 *131
10,121	WAUBAUSHENE 785	8	1	HOOK, D.	HURONIA	73	•	6	173	123	5	6	30 ↑ 100	FR	D	0 SAND + CLAY 117 CLAY 123 GRAVEL + CLAY 127 CLAY 129 SILT CLAY 153 LIMESTONE 173 *123, 170
9831	WAUBAUSHENE 795	8	3	MILLER, DOUGLAS	HURONIA	73	•	6	103	98	8	4	5	FR	D	0 BR SAND 21 CLAY 39 HARDPAN + BOULDERS 51 SAND + CLAY 73 VERY FINE SAND + CLAY 91 CLEAN SHARP SAND 102 CLAY 103 *91
10360	WAUBAUSHENE 730	8	7	MARTIN, W	HURONIA	73	•	6	128	30	4	3	30 ↑ 50	FR.	D	0 HARDPAN + BOULDERS 80 HARDPAN, CLAY, GRAVEL 121 COURSE CLEAN GRAVEL 128 *121

Ministry of the Environment
Ontario

Table Summary of Water Well Records

Date

Prepared by

Well No	Location and Elevation	con	lot	Owner	Driller	year	Well Type	Well Diameter (inches)	Depth (feet)	Static Level (feet)	Pumping Test (gpm)	(hrs)	Pumping Level (feet)	Quality	Use	Remarks. Log etc
9951	WAUBAUSHENE 595	8	3	WARD, B	HAMMERS	74	●	6	32	5	8	1½	9	FR	D	0 TOP SOIL 1 SAND 18 CLAY, FINE SAND 30 LIMESTONE 32 *31
7710	WAUBAUSHENE 590	8	8	COWARD, R	HAMMERS	70	●	6	71	8	30	2	13	FR	D	0 TOP SOIL 1 SAND 3 FINE SAND 15 CLAY 56 CLAY SAND GRAVEL 62 GRANITE 71 * 71
8268	VICTORIA HARBOUR 600	8	9	GATEHOUSE, C	HAMMERS	71	●	6	55	—	4	1½	35	FR	D	0 DUG WELL 12 CLAY 22 LIMESTONE 51 GRANITE 55 *52
6648	VICTORIA HARBOUR 590	8	10	BADURA, R.	LOUIS HOWELL	69	●	4	48	10	20	1	20	FR	D	0 DUG WELL 15 CLAY, SAND, 17 LIMESTONE 40 GRANITE 48 *35
5003	VICTORIA HARBOUR 600	8	16	WOOD, R.	COUPLAND DRILLING	62	●	6	53	25	1	2	45	FR	D	0 BOULDERS GRAVEL 6 HARD LIMESTONE 9 LIMESTONE, SHALE 52 GRANITE 53 *53
5011	VICTORIA HARBOUR SUNRISE BEACH 600	7	15	VAN DEN HEUVEL C.	L. J. HOWELL	67	●	4	35	3	10	1	6	FR	D.	0 SAND STONES 7 LIMESTONE 27 GRANITE 35 *25, 34
6956	CASWELL BEACH RD 590	8	10	KING, H.R.	HAMMERS	70	●	6	44	5	6	2½	5	FR	D	0 TOP SOIL 2 F. SAND 6 CLAY 13 SHALE 14 LIMESTONE 39 SANDSTONE 44 * 34
8294	VICTORIA HARBOUR 580	8	10	RICHARDS, B.	HAMMERS	71	●	6	43	5	18	1	10	FR	D	0 TOP SOIL 1 SAND 4 CLAY 9 CLAY, BOULDERS 14 LIMESTONE 37 SANDSTONE 43 *43
4011	WAUBAUSHENE 626	9	9	HYDRO ELECTRIC POWER COMMISSION	L. J. HOWELL	54	●	4	146	19	7.5	25	91.5	FR	P	0 FILL + TOPSOIL 20 STONES + CLAY 35 SOFT CLAY 40 HARDPAN STONES + BOULDERS 65 SOFT CLAY + STONES 73 SOFT SANDSTONE 75 HARD SANDSTONE 80 GRANITE 146 *35, 65, 75, 143
10083	775	9	5	KNOX PRESBYTERIAN CHURCH CAMP	SNIDER	73	●	6	215	20	40	3	—	FR	P	0 SAND 16 SAND + SILT 34 CLAY WITH SILT 67 CLAY 79 BROKEN LIMESTONE 83 GRANITE 215 *211
10059	WAUBAUSHENE 615	9	10	CLARKE, F.	SNIDER	73	⊣●	7	94	.5 ABOVE GROUND	2	1	—	FR	D	0 TILL 44 GRANITE 94 *89
7041	VICTORIA HARBOUR ROBIN POINT 600	8	14	THOMPSON, R.T.	SNIDER	70	●	6	97	8	25	3	10	FR	D	0 TOPSO 2 LIMESTONE 6 CLAY + GRAVEL 24 GRANITE 97 *96

Ministry of the Environment
Ontario

Table Summary of Water Well Records

Date

Prepared by

Well No	Location and Elevation	con	lot	Owner	Driller	year	Well Type	Well Diameter (inches)	Depth (feet)	Static Level (feet)	Pumping Test (gpm) (hrs)	Pumping Level (feet)	Quality	Use	Remarks. Log etc
8480	WAUBAUSHENE 775	10	7	MANDLEY, A.H.	SNIDER	71	●	6	200	72	3 (2)	—	FR	D	0 CEMENTED SAND+STONES 171 LIMESTONE 200 *198
4013	WAUBAUSHENE 615	10	9	ETHERINGTON, G	HOWELL	51	●	4	72	20	3 (–)	—	FR	D	OF. SAND 60 C. SAND 72 *72
7132	WAUBAUSHENE 680	10	9	COLLOM, E.	SNIDER	70	●	6	67	21	25 (5)	53	FR	D	0 CLAY + GRAVEL 52 SAND + GRAVEL 67 *63
4017	WAUBAUSHENE 600	10	11	ROBERTS, T.	HOWELL	63	●	4	52	16	5 (5)	17½	FR	D	0 DUG WELL 19 HARDPAN + BOULDERS 29 GRANITE 52 *26
4018	630	10	11	ACS, L.	HAMMERS	65	●	6	32	2	12 (2)	15	FR	D	0 TOP SOIL 1 DRY SAND+ BOULDERS 10 SAND, PEBBLES + BOULDERS 32 *30
4021	COLDWATER 745	11	1	M.T.C.	GOODBERRY	57	●	7	105	20	15 (½)	70	FR	In	0 TOP SOIL 2 SAND 32 LIMESTONE 62 GRANITE 105 *59, 83
6165	COLDWATER 585	11	1	WILLIAMSON, BERNICE	ANDERSON DRILLING	69	●	6	31	8	6 (2)	16	FR	D	0 DUG WELL 11 SILTY SAND 25 MED. + F. SAND 31 *25
6472	COLDWATER 765	11	1	HENDERSON, R.	ROTH WELL DIGGING	69	●	3	88	58	2 (1)	76	FR	D	0 CLAY + L. STONES 30 CLAY 65 CLAY+SAND 88 *20, 35, 60, 65, 88
4023	760	11	6	DIXON, R.	HAMMERS	62	●	5	54	40	2½ (1½)	—	FR	D	0 SAND + HARDPAN + BOULDERS 32 BOULDERS 40 GRAVEL + BOULDERS 54
8153	600	11	7	MUIR, W.	SNIDER	71	●	6	155	28	7 (28)	99	FR	D	0 CLAY TILL 3 LIMESTONE 39 GRANITE 155 *152
7741	590	12	10	MUCKENHEIM, D.	HAMMERS	70	●	6	258	4	5 (2½)	6	FR	D	0 SAND 5 CLAY 14 GRANITE 258 *258
4030	630	12	12	KNECHTLE, W.	HOWELL	61	●	4	78	30	5 (½)	66	FR	D	0 CLAY 2 HARDPAN + STONES 22 GRANITE 78 *76

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Table Summary of Water Well Records

Date

Prepared by

Well No	Location and Elevation	con	lot	Owner	Driller / year	Well Type	Well Diameter (inches)	Depth (feet)	Static Level (feet)	Pumping Test (gpm) (hrs)	Pumping Level (feet)	Quality	Use	Remarks. Log etc
9798	650	12	13	HEINZ, A.	M. L. JOHNSTON 73	●	2	65'	4	2 (3)	10	FR	S	O GRANITE 65 *65
9484	685	12	13	DAVIDSON, L.	M. L. JOHNSTON 73	●	2	95	31	3 (1)	41	FR	D	O LIMESTONE 40 RED GRANITE 80 RED+GREY GRANITE 95 *95
4033	610	13	1	LAWRENCE, O.	BALDWIN 66	✱	6	94	—	—	—	—	—	O DUG WELL 18 LIMESTONE 27 GREY GRANITE 94
9021	COLDWATER 601	13	1	DEGOUW, B.	HURONIA 72	●	6	60	28	10 (3)	50	FR	D	O SAND, CLAY, BOULDERS 29 GRANITE 60 *53
10208	600	13	7	WILLIAMS, M.	HURONIA 73	●	6	80	10	2 (2)	80	FR	D	O HARDAN + BOULDERS 40 BLACK GRANITE 80 *55
4715	WAUBAUSHENE 606	13	12	JONES CONSTRUCTION	SNIDER 73	●	6	80	2	—	—	FR	D	O TILL 16 GRANITE 80 *75
9714	750	8	3	WOLFRUM	SNIDER 74	●	6	152	24	5 (3)	84	FR	D	O CLAY 77 CEMENTED SAND + GRAVEL 120 LIMESTONE 152 *145
10797		4	8	VANCAMPS, S.	HAMMERS 74	●	6	191	98	10 (2½)	135	FR	D	O SAND+BLDRS 5 CLAY+BLDRS 51 SAND GRL+SILT 72 CLY 109 SDY CLY 189 GRL SD AND CLAY 191 *190

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Table **Summary of Water Well Records**

Date Nov/77

Prepared by I.P. & J.K.Y

Well No	Location and Elevation TAY TWP.	con	lot	Owner	Driller	year	Well Type	Well Diameter (inches)	Depth (feet)	Static Level (feet)	Pumping Test (gpm) (hrs)	Pumping Level (feet)	Quality	Use	Remarks. Log etc
9956	Waubaushene 800	III	10	Ogden, Steve	Hammers	73	●	6¼	175	136	18 (1)	157	Fr	D	0 Sd, Cly Bld 39 Sd 55 Gr 155 *155
10797	" 810	IV	7	Van Camps	Hammers	74	●	6¼	191	98	10 (2½)	135	Fr	S	0 Sd, Cly + Bld 72 Cly 109 Sdy Cl 189 Gr. Sd + Cl 191 *190
8923	" 810	IV	10	Sweles, J.	Hammers	69	●	6¼	77	50	6 (1)	72	Fr	D	0 Sd + Stns 9 Hp + Bldrs 21 Gr l + Sd 50 *50
6988	" 800	IV	10	Marchant, Ross	Hammers	69	●	6¼	138	60	5 (2)	105	Fr	D	0 Fill 2 Sd Cl, + Bld 10 Cly 41 F. Sd 112 Cly 124 Slt Sd + Gr 138 #6 slot *102-108
6790	" 625	IV	15	Mint Homes Ltd	Snider	68	●	6¼	136	48	50 (2A)	79	Fr	PS	0 Sd 9 Cly 24 Cem Sd, Gr + Cly 72 Bn Ls 135 Gte 136 *AL 135
3955	" 587	V	13	Earle, H.A.	Howell	58	⊘	—	—	—	—	—	—	—	0 Cly + Gr 14 Cly + Stns 65 Gte 67 *Dry
3972	" 725	VI	6	Mount, A.	Snider	66	●	6¼	50	1	40 (2)	11	Fr	D	0 Cly + Bld 12 Sd Slt, Bld 30 Sd 60 *57-60
10920	" 830	VII	6	Thompson, J.	Snider	73	●	6	255	71	4 (3)	160	Fr	D	0 Cly + Stns 94 Cly + Slt 242 Sd 243 Sd + Cly 246 Ls 255 *236
10120	" 790	X	7	Burns, J.	Huronia	74	●	6¼	132	90	3 (2)	110	Fr	D	0 Sd + Stns 68 F Sd 123 Sd 132 *123
8472	" 745	X	7	Willet, N.	Snider	71	●	6	222	88	4 (2)	210	Fr	D	0 Sd + Cem Sd 162 Cly + Sd 185 Ls 222 *210

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Table 2 Summary of Water Analyses

TWP. OF TAY - WAUBAUSHENE, GROUND WATER SURVEY

Prepared by J.P.

Source and Number	Location	Date Sampled	pH	Colour Hazen Units	Turbidity Formazin Units	Specific Conductance mmhos at 25°C	Total Dissolved Solids (ppm)	Total Hardness as $CaCO_3$ (ppm)	Alkalinity as $CaCO_3$ (ppm)	Chemical Constituents in parts per million (ppm)												Remarks
										Chloride (Cl)	Sulphate (SO_4)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potasium (K)	Free Ammonia	Total Kjeld	Nitrate	Nitrite	T.O.C	
1 SURFACE	(SOUTH) MATCHEDASH BAY	8/24/77	8.3			302	202	147	126	17	17	0.25	39	12	7	1.0	<.1	1.4	.4	<.01	6	
2 4018	ACS WELL	"	7.6			487	345	257	220	12	21	0.05	74	17	41	1.7	<.1	.4	3.3	.34	<1	*30' cd + sd
3 4017	MAIDMENT	"	7.3			705	514	350	254	52	58	0.10	109	19	16	1.0	<.1	.4	1.0	<.01	<1	*25' rdp + bld
4 4023	ROBB	"	7.8			361	235	191	175	3	19	<.05	49	17	4	1.6	<.1	.1	<.1	<.01	<1	*40 gvl + bld
5 8480	MANDLEY	"	8.1			378	246	157	121	4	76	0.15	29	21	19	.9	<.1	.1	<.1	.08	5	*192 15
6	MANSER	"	7.7			555	368	304	273	12	36	3.3	74	29	5	2.7	.1	.1	<.1	<.01	<1	
7 6956	KING	"	7.3			995	677	455	364	100	39	0.20	123	36	43	1.5	<.1	.1	<.1	<.01	<1	*34 sh + ls
8 8294	AKKARDS	"	7.4			930	665	438	342	90	37	0.40	106	42	34	3.1	.2	.2	<.1	<.01	1	*43 ss
9 7041	THOMSON	"	7.6			2940	2235	659	135	711	335	0.35	152	68	355	6.4	.2	.2	<.1	<.01	5	*96 gvl cloudy
10 10360	MARTIN	"	8.0			445	290	238	224	3	24	0.65	60	21	4	2.0	<.1	.1	<.1	<.01	<1	*121 gvl
11 10083	KNOX PRESBYTERIAN CHURCH	"	8.0			2220	1575	367	80	307	600	0.15	42	64	350	3.1	.2	.2	<.1	<.01	6	*211 gvl
12	ST RUIX	"	7.2			925	575	320	267	139	21	0.15	102	16	72	1.6	<.1	.1	<.1	<.01	<1	

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Table Summary of Water Analyses

TWP. OF TAY - WAUBAUSHENE, GROUND WATER SURVEY

Prepared by L. P.

	Source and Number	Location	Date Sampled	pH	Colour Hazen Units	Turbidity Formazin Units	Specific Conductance mmhos at 25°C	Total Dissolved Solids (ppm)	Total Hardness as $CaCO_3$ (ppm)	Alkalinity as $CaCO_3$ (ppm)	Chemical Constituents in parts per million (ppm)												Remarks
											Chloride (Cl)	Sulphate (SO_4)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potasium (K)	Free Ammonia	Total Kjeld	Nitrate	Nitrite	T.O.C.	
13	8153	MUIR	8/24/77	8.8			725	460	31	231	81	42	0.05	2	6	160	2.0	<.1	.1	.1	.11	2	*52 gpm
14	SURFACE	(NORTH) MATCHEDASH BAY	"	8.7			236	153	113	95	13	14	0.15	30	9	7	0.7	<.1	.4	.1	.12	14	
15	DUG	FORD	"	7.5			540	387	267	230	20	26	<0.05	78	17	9	2.2	<.1	.2	4.4	<.01	<1	
16	DUG	GAZEY	"	7.4			555	379	283	257	17	26	0.10	86	17	9	2.1	<.1	.2	2.5	<.01	<1	
17		PUBLIC SPRING	"	7.7			385	250	199	157	25	15	<.05	59	13	3	1.2	<.1	.1	.2	<.01	1	

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Table 3 Summary of Water Analyses (Exotics)

TWP. OF TAY - WAUBAUSHENE, GROUND WATER SURVEY

Prepared by J. P.

Source and Number	Location	Date Sampled	Flouride as F	Arsenic as As	Manganese as Mn	Silica as Si	Total Phosphorus as P	Phenols (ppb)		Heavy metals in ppm: Zinc Zn	Copper Cu	Nickel Ni	Lead Pb	Cadmium Cd	Chromium Cr					Carbon: Total Organic	Carbon: Inorganic	Remarks
2 4018	ACS WELL	8/24/77			<0.02	-		-		0.18		<0.02	<0.03	<.005	0.02					<1	52	
5 8486	MANOLEY	"			<0.02	-		-		0.13		<0.02	<0.03	<.005	<0.02					5	26	
8 8294	RICHARDS	"			<0.02	-		<1		0.20		<0.02	<0.03	<.005	<0.02					1	84	
13 8153	MUIR	"			<0.02	-		-		<0.02		<0.02	<0.03	<.005	<0.02					2	49	
14 SURFACE	(NORTH) MATCHEDASH BAY	"			-	-		<1		-		-	-	-	-					-	-	

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MINISTRY OF THE ENVIRONMENT

TABLE 4 SUMMARY OF BACTERIOLOGICAL RESULTS TWP. OF TAY - WAUBAUSHENE, GROUNDWATER SURVEY PREPARED BY J.P.

LOCATION	DATE	FECAL COLIFORMS	FECAL STREPTOCOCCUS	TOTAL COLIFORMS	BACKGROUND COLONIES	
1 (SOUTH) MATCHEDASH BAY	8/24/77	2	2	44	12,100	
2 ACS WELL	"	2	2	2	2	
3 MAIDMENT	"	2	2	2	2	
4 ROBB	"	2	2	2	166	
4-2 ROBB	"	2	2	2	6400	
5 MANDLEY	"	2	2	2	2	
6 MANSER	"	2	2	2	434	
7 KING	"	2	2	2	2	
8 RICHARD	"	2	2	2	2	
11 KNOX PRESBYTERIAN CHURCH	"	2	2	2	2	
14 (NORTH) MATCHEDASH BAY	"	2	24	56	5800	
17 PUBLIC SPRING	"	2	2	2	60	

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